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PHYSIOLOGY.<sup>1</sup>

DOES SUGAR OCCUR IN HEALTHY URINE?—The occurrence of sugar in the urine is a characteristic sign of a well known disease, but many observers have detected in normal healthy urine a sugar like glucose in quantities varying from more than .05 per cent to less than .01 per cent. Professor Wonn Müller has attacked again the question in the following form: Does sugar normally occur in urine? Has the nature of the food influence in determining its presence? Does the excreted sugar differ chemically from that ingested? Observations were made upon two healthy students whose urine proved to be sugar free. Quantities of starch taken just before meal time had no effect upon the composition of the urine.

Levalose taken in the same way was also followed by negative results. Milk-sugar, cane-sugar and glucose, when eaten in quantities of 50 to 250 grammes, could be detected in the urine. It is worthy of observation that the sugar thus excreted was unchanged chemically and had therefore been unaffected by the ferments of the alimentary canal or by the liver cells. During this excretion the amount of fluid passed was, strange to say, rather diminished. The greater part of the sugar found was excreted in 3 to 5 hours after ingestion. Scarcely 1 per cent of the sugar eaten could be recovered in the urine.—*Pflüger's Archiv*. Bd. 34, s. 576.

WHY ALBUMEN DOES NOT OCCUR IN NORMAL URINE.—The laws regulating diffusion in the living body are among the most important and darkest problems of physiology. Albumen passes, under the forces of diffusion and filtration, through the walls of the blood-vessels into the lymph spaces; why does not albumen find its way in the same manner into the glomeruli of the kidney and form a normal constituent of urine? Graham showed, long ago, that various inorganic salts were capable of different rates of diffusion and that the individual diffusibility of each might be altered when more than one salt were mixed together; in general the diffusion of the less soluble salt was retarded. Regéczy, starting from these facts, has come to some interesting conclusions concerning the conditions regulating the diffusion of albumen. He finds that albumen in the presence of a neutral salt diffuses into distilled water less rapidly than when in watery solution, and this difference is more marked the more salt the mixture contains. Albumen diffuses more readily into salt solution than into distilled water. Diffusion of albumen proceeds more rapidly from dilute than concentrated solutions. Pressure upon the side of the albumen aids its diffusion. The explanation for these facts seems to lie in the high osmotic equivalent of the inorganic salts toward which strong diffusion currents of water are attracted, and

<sup>1</sup> This department is edited by Professor HENRY SEWALL, of Ann Arbor, Mich.

these currents accelerate or retard the diffusion of albumen as they chance to move in the same or the opposite direction to the latter. Salt and water are filtered and diffused from the blood into the glomeruli of the kidney. The water rapidly rediffuses back into the denser blood, leaving salt behind and in more concentrated solution in the kidney tubules. These return currents of water prevent the passage of albumen into the tubule, but not of the readily diffusible salts which still continue to leave the blood. The urinary secretion becomes thus progressively denser, and if by any cause the salt contents of the urine so nearly approaches that of the blood that the water currents from tubule to blood-vessel cease, then the passage of albumen begins, and albuminuria is the result.—*Pflüger's Archiv*, Bd. 34, s. 431.

LOCALIZATION OF FUNCTION IN THE BRAIN.—Goltz has long been the principal and worthy opponent of those who hold that the various psychical powers are distinctly and permanently localized in separate parts of the cerebral cortex. But the professor of physiology at Strassburg now concludes from the results of a new series of experiments that, though there can be no such minute distribution of function as Ferrier and others would claim, still there are manifest differences between the physiological properties of different cerebral areas. Goltz submitted a number of dogs to operation, removing in some cases the cortical anterior and in others the posterior portions of both hemispheres. The animals were kept under observation for some months after complete recovery. The behavior of the dogs differed according as the anterior or posterior part of the brain was affected. 1. The dog from which the anterior part of the cortex had been removed retained all the bodily sensations; he may possess a fine tactile sense but still he uses that sense ill. He treads the air with the feet when walking. No muscles are paralyzed, all are under voluntary control, still the movements are clumsy and rather helpless. The attempts at feeding are particularly unskillful; he does not understand how to hold a bone with the fore feet. He does not hesitate to leap down from an elevation. Reflex irritability is increased. Very frequently the animal's character becomes changed so that he is more impatient and more easily angered than before the operation. He wanders restlessly about. Sense perceptions are not weakened in a very marked manner, but general intelligence is always somewhat lowered. 2. The dog which has lost the posterior portion of the cerebral cortex retains undisturbed his tactile sensations and appears to use them well. He does not beat the air with the feet when walking. His muscles are not only not paralyzed but he uses them nearly as skillfully as a normal dog. He hesitates to jump down from an elevation. Reflex irritability is not heightened. If the animal were savage before the operation he becomes quite docile after it; he cannot be stirred up to any emotion. He suffers a general weakness of

perception and his general intelligence is very low. A dog which has suffered the loss of the anterior cortex has usually a tendency to emaciation, while one whose brain has been operated on posteriorly is always fat; the former animal is also liable to a severe skin disease accompanied by itching.—*Pflüger's Archiv*, Bd. 34, s. 450.

### PSYCHOLOGY.

THE PSYCHICAL RELATION OF MAN TO ANIMALS.<sup>1</sup>—Professor LeConte's article opens as follows: "In the *Review* for November, 1878, I published an article on 'Man's place in nature.' The present article may be regarded as a continuation of the subject from a different point of view. In the former article I tried to show how, without violating the laws and analogies of nature, the spirit of man may be conceived to have arisen by progressive individuation out of the forces of nature, through the vital principle of plants and the anima of animals. In this I wish to fix attention on the last and most important step, and to determine, if possible, its nature. I wish to show in what consist the essential differences between the spirit of man and the anima of animals."

Professor LeConte admits the probable evolution of the human mind out of the animal mind, but believes that at some point of history, one perhaps coincident with the origin of the human species, a new type of mental power originated, which constitutes the spirit of man. He illustrates this proposition by reference to the history of development of human individuals at the present day. He traces the appearance of this especial power in the growth of the mind of the child, in language, in useful art, in fine art, in thought proper, in self-consciousness, and in free will. The power in question is simply the power of generalization. It commences in thought, in which it is the perception of law; it appears in speech in the power of expression of such perception of law; in useful art in the conscious working for a purpose; in fine art in the perception and execution of harmonies. These propositions are clearly presented and ably argued. They express a great truth, one which is probably true of all normal human beings. It is, however, not so certain that the power of generalization is limited to man. It is probably not so limited, but exists in a small degree in the mental operations in the highest animals. Hence we cannot perceive that Professor Le Conte proves in this way the existence of a "human spirit," distinct from "the anima of animals." Professor Le Conte does not, it appears to us, grant sufficient mentality to animals, especially in his discussion of imagination (p. 252). His belief, however, that the memory of animals is not, in their minds, distinguished from present events, is probably partly true, though we can scarcely believe that the highest animals do not retain an idea of the true successional relation of events.

<sup>1</sup> By Professor Jos. LeConte, from the *Princeton Review* (no date on the separata).